

*Case report***Acute Renal Failure Following the Saharan Horned Viper (Cerastes cerastes) Bite**Driss Elkabbaj<sup>\*1</sup>, Kawtar Hassani<sup>1</sup>, Rachid El jaoudi<sup>2</sup>

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**Abstract**

**Introduction:** The Saharan horned viper (Cerastes cerastes) is a common snake in the sandy and rocky regions in the south of Morocco. Although nearly all snakes with medical relevance can induce acute renal failure (ARF), it's unusual except with bites by some viper species. ARF has very rarely been reported following Cerastes cerastes bite.

**Case Report:** A 55-year-old Moroccan man was bitten on his right hand by a Saharan horned viper, Cerastes cerastes. He presented 24 hours later in a state of confusion, agitation and hypotension with marked swelling of his right hand. Investigations revealed evidence of disseminated intravascular coagulation (DIC) and rhabdomyolysis. The appropriate antivenom was not available. Despite adequate hydration, he developed acute renal failure necessitating prolonged hemodialysis. He subsequently improved and was discharged from the hospital after four weeks with normal renal function.

**Conclusion:** Although uncommon, the bite of Cerastes cerastes can result in ARF due to DIC and rhabdomyolysis. The appropriate antivenom should be made available in areas where this snake is prevalent.

**Keywords:** Acute Renal Failure; Antivenom; DIC; Cerastes Cerastes; Rhabdomyolysis; Snake Bite

*The authors declared no conflict of interest*

**Introduction**

In Morocco, poisonous snake bites are a serious health challenge due to their morbidity and mortality. Several snake species are identified in Morocco and Cerastes cerastes is a common viper snake which occurs mainly in the sandy and rocky regions in the south of Morocco [1]. Clinical profiles of viper envenomed patients may vary from minor local symptoms to extensive systemic manifestations that, at times, may prove fatal soon after the bite. Acute renal failure (ARF) associated with poisonous snake bite has been reported from various part of the world [2]. Although nearly all snakes with medical relevance can induce ARF, it's unusual except with bites by some viper species like Russell's viper, Echis carinatus and members of the genera Crotalus and Bothrops [2]. It is a rarely reported complication following the Cerastes cerastes bite [3].

In this work, we report a case of reversible ARF induced by Cerastes cerastes bite with a review of the pathogenesis, pathological features and management of this entity.

**Case Report**

A 55-year-old man was bitten on the second finger of his right hand by a specimen of Cerastes cerastes in the south of Morocco. The patient had received the first aides in the local hospital before being admitted to the

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**Table-1: The patient's laboratory parameters at admission**

Parameter	Level
<b>Blood/serum</b>	
Sodium	137 mmol/L
Potassium	4.7 mmol/L
Creatinine	4.3 mg/dL
Phosphorus	3.2 mg/dL
Calcium	8.7 mg/dL
Creatine phosphokinases	15 000 u/L
Lactate dehydrogenase	174 u/L
Myoglobine	150 mg/L
Prothrombin Ratio	49%
Platelets	37 X10 <sup>9</sup> /L
Fibrinogen	1.35 g/L
Hemoglobin	12 g/dL
Total leukocyte count	13000/mm <sup>3</sup>
D-dimer	600 µg/ml
<b>Urinalysis</b>	
Color	Dark
pH	5.0
Protein	+
RBC	15-30 /HPF

department of intensive care, military teaching hospital of Rabat, 24 hours after the snake bite. The patient denied past history of diabetes, hypertension or other chronic medical diseases, but reported chronic cigarette smoking. On admission, he was confused and agitated with a pulse rate of 130 a minute and blood pressure of 80/40 mm Hg. The patient had a Glasgow coma score (GCS) of 10, without focal neurological deficit. There was marked swelling of the right hand extending to the shoulder. The laboratory parameters at admission, as given in Table-1, showed signs of disseminated intravascular coagulation (DIC) and rhabdomyolysis with creatine kinase level of 15 000 u/L.

The patient was given repeated doses of polyvalent immune serum (FAV-Afrique, Sanofi Pasteur, France). He was also given intravenous saline according to his volume status and urine output. He was started on amoxicillin/clavulonic acid, morphine and calcium heparin injections. Despite good hydration, the patient's renal function deteriorated 24 hours after admission. He was started on hemodialysis which was needed daily for twenty four days for control of hyperkalemia, correction of acidosis and treatment of volume overload. The patient's general condition as well as renal function started to improve by the end of the fourth week. At the time of discharge, his

**Figure-1: The Saharan horned viper, Cerastes Cerastes**

renal function stabilized at creatinine level of 1.6 mg/dL and his salient laboratory parameters were normal.

### Discussion

The Saharan horned viper (*C. cerastes*), easily recognised by the presence of a pair of supraocular horns, is the most distinctive and most abundant venomous snakes in the south of Morocco (Figure -1). The length of the *Cerastes* viper does not exceed 70 cm and females are larger than males. The venom of the *Cerastes* viper contains predominantly enzymatic components with proteolytic activities which affect the coagulation system. The venom components have fibrinolytic activity and thrombin-like activity that may result in factor X activation and platelet aggregation [4-6]. This can result in DIC and microangiopathic hemolytic anemia.

Acute Kidney Failure (AKF) is a serious clinical complication following some snake bites. It may result from varying degrees of bleeding, hypotension, rhabdomyolysis, circulatory collapses and disseminated intravascular coagulation (DIC) [2]. All these factors were present in our patient probably resulting in acute tubular necrosis. However, no renal biopsy was performed.

*C. cerastes* is often preferred by snake keepers in Europe. There are few reports of ARF following *C. cerastes* bite in the literature [3], and the current report confirms the potential of this viper bite to result in life threatening intoxication. Our patient initially received inappropriate antivenom (FAV-Afrique) which was administered 48 hours after the snake bite without any clinical improvement. In Morocco, only FAV-Afrique antivenom sera are available; but they are not appropriate to treat *C. cerastes* snakebite. FAV-Afrique is a polyvalent equine F(ab')<sub>2</sub> antivenom for Sub-Saharan African snakes : *Bitis*, *Echis*, *Naja* and *Dendroaspis*. It would have been

necessary to use the FAVIREPT antivenom (Sanofi Pasteur, France) which is another polyvalent equine F(ab')<sub>2</sub> antivenom for Middle East snakes : Bitis, Echis Naja, Cerastes and Macrovipera.

The prevention of ARF due to rhabdomyolysis requires early and aggressive fluid resuscitation. The goals are to maintain renal perfusion, increase the urine flow rate which will limit intra-tubular cast formation and increase urinary potassium excretion. Intravenous isotonic saline should be administered as soon as possible and continued until the muscle injury has resolved and the value of plasma CK level is stable and not increasing.

## Conclusion

Although uncommon, the bite of *Cerastes cerastes* can result in ARF due to DIC and rhabdomyolysis. The appropriate antivenom should be made available in areas where this snake is prevalent.

## References

1. Lallie H, Hami H, Soulaymani A, Chafiq F, Mokhtari A, Soulaymani R. Epidemiology of snakebites in Morocco. *Med Trop (Mars)*. 2011 Jun;71(3):267-71.
2. Kohli HS, Sakhuja V. Snake bites and acute renal failure. *Saudi J Kidney Dis Transpl*. 2003;14(2):165-76.
3. Schneemann M, Cathomas R, Laidlaw ST, El Nahas AM, Theakston RD, Warrell DA. Life-threatening envenoming by the Saharan horned viper (*Cerastes cerastes*) causing micro-angiopathic haemolysis, coagulopathy and acute renal failure: clinical cases and review. *QJM*. 2004 Nov;97(11):717-27.
4. Basheer AR, el-Asmar MF, Soslaw G. Characterization of a potent platelet aggregation inducer from *Cerastes cerastes* (Egyptian sand viper) venom. *Biochim Biophys Acta*. 1995 Jul 3;1250(1):97-109.
5. Marrakchi N, Zingali RB, Karoui H, Bon C, el Ayeb M. Cerastocytin, a new thrombin-like platelet activator from the venom of the Tunisian viper *Cerastes cerastes*. *Biochim Biophys Acta*. 1995 May 11;1244(1):147-56.
6. Laraba-Djebari F, Martin-Eauclaire MF, Marchot P. A fibrinogen-clotting serine proteinase from *Cerastes cerastes* (horned viper) venom with arginine-esterase and amidase activities. Purification, characterization and kinetic parameter determination. *Toxicon*. 1992 Nov;30(11):1399-410.